"Skip Planting a Row or Two" Is Good Advice for Some

Many grain farmers in the arid central Great Plains should skip planting every one or two rows to stabilize corn yields.

This recommendation stems from a 3-year study with corn in 23 field trials across Nebraska and into western Kansas and northeast Colorado. Merle Vigil, a soil scientist at the ARS Central Great Plains Research Station in Akron, Colorado, participated in the study with 13 university and extension researchers.

"Plant two-skip two" stabilizes yields the most in the driest years and should be considered the best scheme during extreme drought. But "plant one-skip one" resulted in the highest mean yield of all planting systems tested, over average weather conditions, and many times exceeded both the standard technique and "plant two-skip two." Vigil had similar results with sorghum.

For many farmers, in a climate that goes from dry to drier, the range of possible grain yields is too large and unpredictable with standard spacing. The skip-row technique narrows the range of yields, cutting off the lowest yields as well as the highest. The narrower the range of yields, the more stable they are and the less risk involved.

Skipping a row or two allows some of the soil water accumulated between crop rows to remain as a reserve for when the crop needs it later. For corn, it provides water during the critical flowering period.

Early in the corn-growing season, roots easily reach and deplete water that is about 30 inches away, between rows, but they can't as easily deplete water farther away.

Vigil says, "The benefits of skip-row planting should be considered by all dryland corn growers in the central Great Plains west of 101 degrees longitude, except for those with potential for more than 100 bushels an acre.

"More specifically," he says, "farmers with field histories of 75 bushels or less could choose either 'plant two-skip two' or 'plant one-skip one.' Those with yield potential between 75 and 100 bushels an acre may not see a benefit from skip-row planting."—By **Don Comis,** ARS.

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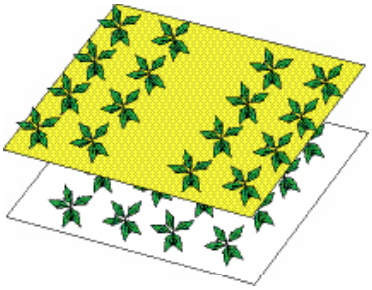

Partnering With the NRC

When conducting risk-assessment studies for commercial nuclear facilities, the U.S. Nuclear Regulatory Commission (NRC) must be able to assess the movement of radioactive material in the environment. So Agricultural Research Service soil scientists Timothy Gish, Yakov Pachepsky, and Andrey Guber partnered with NRC researchers to evaluate and improve the accuracy of subsurface contaminant transport models.

The team set up their study at the ARS Beltsville Agricultural Research Center in Beltsville, Maryland, at a site that is equipped with remote sensing gear and other instrumentation for monitoring a range of geophysical and biophysical processes. This site—the Optimizing Production Inputs for Economic and Environmental Enhancement (OPE3) study area—was set up in 1998 to study major environmental and economic issues facing U.S. agriculture.

The researchers wanted to assess how the vadose zone—the zone between the soil surface and the groundwater zone—affects contaminant transport. They focused on subsurface structural features, processes, and events in the vadose zone that could drastically change the fate and transport of pollutants in a contaminant plume.

Over 2 years, the team added several nontoxic chemical tracers to irrigation water and used 12 site wells to monitor levels of those tracers at 3 different depths in the soil. Surface runoff, soil moisture profiles, soil water potential, groundwater levels, and weather variables were also monitored.

The researchers compared the field data they collected on water flow and tracer concentrations with results from model simulations. Then they applied a range of abstraction techniques to models of varying complexity to further pinpoint conditions that could significantly affect the movement of water—and contaminants—below the soil surface.

For instance, they found that tracer transport in soils and shallow groundwater could be strongly affected by gaps in the vadose zone's restrictive fine-material layers. The complex topography in this layer could cause preferential flow and transport along pathways in low parts of the surface.

Similar dynamics could direct preferential flow around natural capillary barriers and funnel subsurface flow through coarse-textured soils sandwiched between finer layers. In addition, continuous voids in fine-grained sections could also prompt rapid flow conditions.

NRC staff will be able to use the refined models to estimate pollutant transport scenarios for risk-assessment studies of nuclear facilities.—By **Ann Perry,** ARS.

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